APPENDIX B

WEATHER EFFECTS ON AIR DEFENSE ARTILLERY

Air defense artillery (ADA) requires weather information for both deployment and employment. Deployment requires climatological data, trafficability, and severe weather forecasts. Weather conditions affecting employment vary according to the type of weapon system used. When missle systems require radar surveillance, elements such as refractive index and precipitation must be known. Other systems require visual target acquisition. Listed below are weather effects for ADA that are not contained in the WTDA tables.

CLOUDS AND SKY COVER. Overcast skies degrade visual acquisition and tracking. Low overcast limits the effectiveness of aerial illumination devices. Clouds limit the use of NVD by blocking natural light from the moon and stars.

HUMIDITY. Moisture in the air affects the refractive index and may degrade radar effectiveness.

ILLUMINATION. Most NVD require about a quarter (23 percent) of the moon, 30 degrees above the horizon, scattered clouds, and the sun more than 5 degrees below the horizon. Detailed products dealing with the use of E-O devices are available from the SWO.

PRECIPITATION. Rain, sleet, or snow prevents visual target acquisition and tracking. Precipitation attenuates radar signals and degrades or prevents infrared homing.

REFRACTIVE INDEX. This index (see glossary for a description) degrades target acquisition and tracking radar.

SURFACE WIND. Strong surface winds produce blowing dust, sand, or snow and may cause computers to malfunction.

TEMPERATURE. High temperatures can degrade the effectiveness of electronic systems, and very low temperature may affect mechanical devices. Extreme cold produces detectable ice-fog exhaust trails from certain weapon systems and vehicles.

THUNDERSTORMS AND LIGHTNING. Intense electrical storms will probably mean that electronic systems will be out of service.

VISIBILITY. Low visibility decreases the effectiveness of visual collection systems.

Table B-1. Weather effects from cloud ceiling.

WEATHER VALUE (FEET)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
LT 500			Weapon selection	Type weapon
LT 1,000			Army aviation operations	See app E
LT 2,500	Visual detection/ identify aircraft			
LT 5,000			Visual detection, identify aircraft	

Table B-2. Weather effects from reduced visibility.

WEATHER VALUE (METERS)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
LT 200			NVG (PVS-5)	
LT 400			NVS (PVS-2)	
LT 600			NVS (PVS-4)	
LT 1,200			NVS (TVS-2, TVS-5)	
LT 2,000			NVS (TVS-4)	
LT 3,000			VULCAN CHAPARRAL	
LT 5,000			STINGER REDEYE	

Table B-3. Weather effects from surface wind.

WEATHER VALUE (KNOTS)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
GT 7			GSR	Increased noise
GT 20	GSR	Increased noise	Communications antennas NOE operations	
GT 25			Personnel	
GT 35	HAWK acquisition radar HAWK support system Illumination radar (MPQ-57)			
GT 40	Personnel			
GT 50	Communications antennas			
GT 65	HAWK launcher			

Table B-4. Weather effects from temperature.

WEATHER VALUE (°F/°C)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
LT -25/-32	HAWK missile system Dry cell battery Personnel	Only 20% effective	Generators	wo Arctic kit
LT -20/-28			Maintenance	Takes five times longer
LT -0/-18			Wheeled vehicles Dry cell battery 20-mm ADA gun	wo winter kit Only 40% effective Uses cold precaution
LT 32/0			Personnel	See app L for windchill
GT 85/29			Personnel	See app L for water consumption
GT 90/32	HAWK missile system			
GT 95/35	Personnel	See app L for water consumption	Dry cell battery	Will not hold charge
GT 120/49	REDEYE STINGER			
GT 125/52	Generators			

Table B-5. Weather effects from precipitation.

WEATHER CONDITION	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
Light rain or snow			Mortar operations Wheeled vehicles	Sight glass fogs up
Moderate rain or snow	Wheeled vehicles		LOS communications Personnel movement Laser systems Target acquisition Equipment storage	
Heavy rain or snow	Mortar operations Personnel movement LOS communications Target acquisition Laser systems			
Thunder-storm/ lightning	HAWK (within 1.2 miles)		Ammunition Radar system (within 1.2 miles) Refueling operations Communications Equipment storage	Safety Interference
Light freezing rain			Personnel Wheeled vehicles	
Moderate freezing rain	Personnel Wheeled vehicles		Missile launching	
SNOW DEPTH (INCHES)				
GT 3			Personnel movement	
GT 6	Personnel movement		Wheeled vehicles	
GT 12	Wheeled vehicles			
GT 20			Tracked vehicles	
GT 30	Tracked vehicles			